Preliminary Science Flight Report
Operation IceBridge Antarctica 2011

Flight: **GV-FL03**
Mission: **LVIS-PIGRepeat**

Flight Report Summary

Aircraft	**NSF G-V (N677F)**
Flight Number	3
Flight Request	118003
Date	Monday October 10^{1h}, 2011, DOY 283
Purpose of Flight	Operation IceBridge Mission, LVIS PIG Repeat
Take off time	8:38 local time from Punta Arenas (SCCI)
Landing time	19:10 local time at Punta Arenas (SCCI) on October 8, 2011
Flight Hours	10.5
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	• High-altitude survey (~42,000 ft pressure altitude) of grid lines • Completed mission as planned. • Conducted roll and pitch maneuvers for LVIS calibration at end of flight
Geographic Keywords	Antarctica, Pine Island Glacier, West Antarctic Ice Sheet, WAIS
ICESat/CryoSat Track	Icesat Track 0264, Grid lines cross numerous Icesat tracks
Repeat Mission	Repeat of 2009 LVIS PIG flight; Overlap with previous IceBridge data at Pine Island

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
LVIS	☑	☒	☑	45 GB	None
POS/AV (510 + 610)	☑	☑	☑	5 GB	None
LVIScameras(2)	☑	☒	☑	25 GB	None
G-V Onboard Data	☑	☑	☑	40 MB	None

Mission Report (Michelle Hofton, Mission Scientist, Instrument Operators: David Rabine, Shane Wake)

The third LVIS NSF/G-V flight of 2011 surveyed a series of lines over the Pine Island glacier as well as a 360km long portion of IceSat Track 0264. At PIG, nine ~130km long lines, spaced ~4km apart and extending from the grounding line inland were surveyed. All planned lines were surveyed, a total of ~1700 lineal km, resulting in at least 3,400 km^2 illuminated and precisely mapped. The survey is part of the overall deployment plan to collect grid data over a large region that encompasses the entire Antarctic Peninsula to the Getz Coast. This survey repeated 9 of 11 lines flown during the LVIS 2009 ICEBridge DC-8 Deployment. These LVIS data will enable a precise surface change map of PIG to be made when compared to the 2009 LVIS data. And, the wide spatial coverage from high-altitude swath mapping maximizes overlap with the existing ICESat data to create an 8-year record of elevation change (2003-2011).

The weather was predicted to become increasingly cloudy during the day, however the plane was able to depart ahead of schedule to maximize cloud-free operations. Both transits to and from the survey area were partially cloudy, but some sea ice data were collected in the Bellingshausen Sea and close to Abbott. Weather over the survey area was clear, as predicted. There was some increasing haze through the survey time but it did not affect LVIS data collection.

The LVIS sensor worked very well. Data was successfully collected over 100% of the survey lines and on the transit over land to and from the target area.

During the survey, the aircraft experienced very low outside temperatures in flight (-76C). Flight altitude was periodically decreased (to a minimum of 38,000') and speed was increased to warm the wings and fuel. The technique was successful and allowed the survey to continue without issue.

A ramp pass was flown upon return to Punta Arenas at 10,000 ft for calibration of the LVIS absolute elevations. Roll and pitch maneuvers were performed on outgoing and return legs.

The power issue with the cameras appears to be solved.

Individual instrument reports from experimenters on board the aircraft:

LVIS: The LVIS system worked well.

POS/AV: Systems worked well. No issues.

LVIScam: System worked well. No issues.

G-V on board data: System worked well.

Pine Island Glacier from the LVIS instrument operator's seat at 40,000 ft in the NSF/NCAR G-V aircraft. (Photo credit: David Rabine)

Coverage image from Today's PIG repeat flight (Credit: Matt Beckley)